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ABSTRACT

This paper presents a new European teaching model based on ideas and methods of Socrates, Jean Piaget, and Lev S. Vygotsky. The starting point for this new model was the use of Socrates' dialectical method in teaching 906 primary and secondary school students the reduplication of a square. Results of this exercise were compared with Piaget's and Vygotsky's work on similar issues. It was found that a deductive strategy, whereby children were encouraged to discover knowledge rather than simply have it provided to them, reduced the age at which children understood the reduplication of the square. From this research, and the cognitive approaches to learning developed by Piaget and Vygotsky, a didactic model was formulated. The model was designed to enable students to develop mastery learning by allowing them to learn from their mistakes. It is suggested that the dialectical relationship between work, human interaction, and the quality of life should be considered in any curriculum that focuses on a multifold and multicultural education. (MDM)

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A European Teaching Model: From Vygotsky to Socrates via Piaget

In his Utopia "Looking Backward" written a little more than a hundred years ago (Boston 1898) Edward Bellamy mentions that in 2000 A.D., the Socialist State was organized as a big enterprise and thus became the exclusive capitalist, sole employer, and the biggest monopoly. The reason why I referred to Bellamy is not so much in order to highlight the fact that the prophecies of a non-conformist Utopian writer were fulfilled in our times or not, but rather in order to indicate an alternative way of educational pursuit, such as the Utopians' who with free, more humane procedures moved through time, from present to future, from future to past and from past to future.

This type of voyage in time is not only to Utopian or kvantum Theory on time, but of educators as well, even if they do not wish to be characterized utopians or pure physicists. They must however, recognize that travelling through time constitutes the main element of their scientific nature, since, for example, their cognitive products will be consumed by today's students in ten to twenty years when these students go out in the world. Thus if we wish to speak from the children's point of view we should reverse time and move backwards from future to present and the past so that we have a child centered education, at least as far as our voyage in time is concerned. Moreover, many educators such as A. Toffler (1974), T. Husén (1979), B. Guereshunsky from Moscow, Pruha from Prague, as well as organizations such as The Plan Europe 2000 of the European Cultural Foundation, the Club of Rome (No Limits to Learning, Bridging the Human Gap), The Carnegie Foundation, the Aspen Institute for Humanistic Studies, Education 2000 in England, OECD, Unesco (1985, 1987, 1984) etc. negotiate the future of education with scientific analysis floating through time.

Such a voyage or floating through time belongs to a European style rather, as Europe is not only a geographical entity, not only a New Look, but it includes in its history its own traditional style which suggests ways of life and common cultural trends. Starting from these ideas we tried to discover common tendencies in education which had been realized in different European countries and different time spans. Thus we arrived at the conclusion that the common trends which unite the European countries point to a possibility of a common symmetry which shapes the European Teaching Model.

Every educational research, as we all know, aims at responding to the needs which arise in the society where the researchers live, especially at times of crisis, when there is a demand for outlets in every social area and particularly in education. It was natural for me then, as an educator who lives in Greece which for twenty years now has been trying to find new economical, social and cultural ties with other European countries, to turn to two educators: J. Piaget, the renowned European psychologist, philosopher and epistemologist, (J.J. Ducret, 1990), whose courses I attended for four years in Geneva (1962-1966) on the one hand, and on the other to Socrates, the first systematic European educator.

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Through Socrates it became evident that not only other philosophical theories had to be investigated but also the so called classical theories of education of Rousseau, Pestalozzi, Froebel, etc. In addition, through Piaget and A.I. Luria, Vygotsky's theories began to be studied in the West after Piaget's response (1962), and Bruner's analysis on cognitive processes (Bruner 1956). In particular after the 1980s, Vygotsky became widely known not only as the initiator of Meta-Piagetian aspiration with the zone of proximal development but also as the initiator of the Cultural Historical Theory. This theory is closely associated with the Anthropological Approach, with Interactionism, the semantic aspect of Communication and the cognitive processes of the Dialogue between man and the computer after the 1970s.

All these views mentioned above, which constitute areas of particular investigation and analysis for the school of the future, have made it possible to formulate a European Teaching Model which we will briefly announce in this presentation.

Our research for the formation of a European teaching model involves two different levels of approach and related between them are features which are common among reflective educators of Europe. These two levels of approach concern: 1) the curriculum content and 2) the teaching learning method. The two levels interweave in the creation of a European teaching style.

We begin from the teaching-learning method, one of the component levels which results in a metacognitive teaching approach. It has its roots in the Dialectics of Socrates which promoted interactive communication rather than external dialogue. The starting point for the exploration of the teaching paradigm was the application, on 906 primary and secondary school students, of Socrates' well known course of action for the reduplication of the square (Plato's MENON, 81e-85b) and Piaget's survey on the same subject (Piaget, La Geometrie Spontanée) as well as Vygotsky's Zone of Proximal Development.

In the 1960s, the search for novel teaching methods led to new technological resources (electronic teaching machines, television, the first computers, etc.). We did not wish to reject those aspirations or accomplishments. Nevertheless, in ancient Athens, we found that Socrates, despite the lack of technological means, and living in one of the first democratic city-states, had decisively grasped the child-educator communication mechanisms and he has the inspiration for problem-solving method and Dialogue.

Briefly, the issues investigated through the research with the Socrates method are: a) the procedure of the child's understanding the concept of the square reduplication, b) the process of comprehending the subdivision of the square, c) the comparison of the research's results to Piaget's findings and d) the possibility of applying Socrates' Dialectics to children.

The reduplication of the square through Socrates' Dialectics was taught: a) with the implementation of paper and pencil; this technique is directly related to Socrates' system, who used to draw his shapes on the ground, b) with short plastic rods, and c) with colour plastic triangles and squares. The two additional techniques were employed so that it could be tested whether tangible materials facilitate the deductive dialogue.

The most important conclusions drawn from the research are:

1. The deductive strategy reduces the age of children's understanding of the reduplication of the square as compared to Piaget's psychological assumption. It generally assists children to grasp quite thoroughly the concept of the reduplication of the square, a very essential gain for the children's knowledge of geometry as well as their initiation into abstract thought or to generalization, according to Davydov.

2. What mainly defines the deductive method as such is the provision of facilitating strategies at the appropriate moment (the essence of the interactive process) rather than the implementation of the dialogical communication (exterior form). It would be wise for pedagogy to use "Deviation Routes" in order to lead children to required knowledge rather than wait for the "psychologically" acceptable maturity level. The decisive educational intervention in the child's mental mechanisms is likely to bring about significant changes as far as the time of appearance and the rate of development of those mechanisms are concerned. This position is closely related to the Zone of Proximal Development of L.S. Vygotsky.

3. Children could be possibly taught difficult subjects if they are encouraged to replace complex mechanisms with simpler, pre-existent intellectual schemes. This proposition is the extension of the positions of J. Piaget and is connected with the views of J. Bruner.

4. The research concludes that the application of Socrates' Dialectics could be profitable to primary school children as well as children attending the lower high school classes. Dialectics, therefore, could be considered a very important direction in teaching methodology, provided it respects the essence of the interactive process and is not reduced to a type of false dialogue or "dialogical" monologue.

Based on the results of this research and on the careful observations made, we were able to shape Socrates' DIDACTIC SCHEME. This scheme is divided into three phases: the introduction, the intermediate proceedings, and the conclusions. Graphically, it presents a linear course and another process of finding alternative solutions of "deviation" routes for the achievement of a solution (See diagram).

The teaching process commences with a testing of the pupil's supply of knowledge, information, concepts, etc., which are directly related to the particular problem or the objective of teaching, which could be defined specific rather than general or vague terms.

The next stage of the procedure demands the pupil's answer or response to the problem or to the purpose of teaching. When the pupil has solved the problem or accomplished the teaching aim, his response is analyzed and checked. In the case, however, that the solution produced by the child was random or frivolous, further explanations are provided and the solution or answer is extended to similar areas. The process is followed in the linear course of the model.

When the pupil's response to the problem is incorrect, or he fails to comprehend the Teaching objective, then we may turn toward a search of alternative solutions or "peripheral" routes. This process involves exploration and elimination of error. The latter is identified, proved, and confirmed, and a situation of wonder is created.

The basic characteristics of the model are:

1. The problem or the educational aim is accurately defined with terms which determine the final learning effect.
2. Through the "peripheral" routes, the pupil's erroneous answer is exploited to the end of mastering truth (metacognitive procedure - mastery learning).
3. Even when he makes a mistake, the pupil continues to actively participate in the attempt to discover true knowledge.

This procedure is contrary to the position of rejecting the mistake which is used in schools, where the mistake is the secret taboo of the teacher. Of course, the pupil is not encouraged to make a mistake but he lives in the atmosphere where the mistake is a way of learning as is supported by L. Wittgenstein: from the mistake, one has to begin and transform it into what is true.

This brief presentation of a teaching method which begins from the Dialectics of Socrates, takes today the form of a teaching model which includes the elaborated analysis of the cognitive approach of J. Piaget, J. Bruner, and L.S. Vygotsky. This Didactic scheme, however, does not only function as a teaching model, but it also includes the contents of the curriculum: as the content initially functioned for Socrates in the "maieutic" teaching method. In other words, the teaching model in relation to other methods of teaching has digested in a dialectic correlation the manner and the teaching contents (Lundgren, 1981). This enables us to proceed, as is done further on, toward the extension of its contents.

The teaching model of Socrates contains also many positions which are known to us from the literature on creativity, as well as that of productive thinking of M. Wertheimer, for example of problem solving, as man, fested in the current state of the cognition process (R. Mayer, 1983).

This connection between the process of learning which began 2500 years ago in Europe in the framework of an ancient democratic city-state with Socrates and which continues today under new conditions ways and with renewed procedures, either in Stockholm with Ulf Lundgren with his "theory on teaching", or in Moscow with V.V. Davydov with his theory of generalization, as well as in your homeland (V. Engeström, P. Hakkarainen), shows that there are certain trends which contribute to the formation of a teaching model.

This teaching model is based on: a) an analysis of the teaching reality and the creation of a problematic situation, b) the acceptance and the transgression of a mistake, c) the corrective routes based on the analysis of the educational reality and finding alternate ways or solutions, d) forming a climate of well-being and the emotional satisfaction of success, e) the positive influence of past experience, f) critical evaluation for discovery of the "correct", g) the function of the "correct", not as a final result, but as a transitional reality serving man in certain circumstances, h) a dialectical relationship of method and curriculum content.

These teaching procedures are believed to be more compatible in a generally situation, in an open society as Karl Popper describes. In ancient Greece from the 6th century B.C. on when the democratic regimes started to be established it became evident that they all had not only political framework but mainly a socio-economic and cultural content. In every city which had embraced democracy a climate of

economic revolution gradually prevailed promoting the world of work and especially new lines of work, such as shipyards, potteries, small manufactures of arms, etc. and above all trade. In the Greek democracy, the individual was liberated from all social and economic taboos and focused on the network of commercial transaction, monetary exchange and conflict of ideas.

The most significant founders of cities or wisemen, like Solon, the founder of the Democracy of Athens or Thales from Miletos were philosophers, scientists, owners of factories with "new technology", but mainly they were businessmen and thus related to many other countries (Egypt, etc.). Thales from Miletos was a philosopher, engineer, geometrician and trader. Geometry was considered as the new technology of the times, since it was the means through which every work of art from statues to the Acropoles were conceived. Their travels to foreign countries were intended for business and observation of other nations and civilizations. Ulyses was a traveler, a "wandering lover", but above all he was an observer of human nature, what we might call today a multicultural citizen as well as a good shipbuilder. Socrates was a philosopher but chose to call himself a mason and turned to the experience of craftsmen whenever he had to solve a problem. The ancient democracies, *mutatis mutandis*, sometimes remind me of European countries which also have their economic, social, technological and cultural constituents and which in the old as well as contemporary times sustain a strong relation between the exchange of money and the exchange of ideas.

Common studies and research which can be undertaken by representatives of different countries in the framework of our Association will probably confirm these positions, not only with the data of one country and with theories, but also with data of research studies and transmittion of teaching models from one country to another.

The starting point which we referred to, earlier, concerning the teaching model of Socrates with a slave reduplicating the square, as well as the Pythagorean theorem, was the beginning of such research: a) the relationship of the geometrical conception of the world, of the democratic view of life, b) the relationship of geometry with beauty, c) the relationship of the knowledge of geometry with the world of organized and systematized action of man in the world of work.

These findings led us to the relationship of Socrates' teaching model as it developed earlier, with the content curriculum in which the democratic school process, the world of beauty, and the world of work plan a significant role. So, the level of teaching-learning method finds dialectical relationship with the level of content curriculum.

Therefore, the first position which ensues from the research in the field of the content curriculum is that in education the militarist spirit and the authoritarian attitude lead to deadlocks and irrevocable results. In contrast, a Democratic stance can lead us manifold combination of knowledge, involving procedures, methods, as well as the internal facets of the personality of man. The latter is the product of social, productive, financial developmental and thus multiple human and democratic procedures and forces.

According to these definitions education should not be simply considered as the mere procedure that unites human but also the guarantee for the democratization of social structures in all developed and developing countries.

Concerning the second position on the content curriculum which constitutes an extension of the democratic view of education that knowledge is not exclusive to the children of those who are in power or hold the majority but to the children of all citizens. This position necessarily indicates that knowledge is neither quantitative, nor straight or linear, but qualitative, as it is created through oppositions and the antagonism of the free market. So it is well known that in Sparta, which was governed by tyrannies, quantity ruled - the arithmetic relation - the straight and oblique line. In the Democracy of Athens, on the other hand, ruled quality - the geometrical relation - the curved line, which constitutes a manifold composition of lines and angles, never the rigid straight line alone. In the Parthenon, for example, the straight line, the arithmetic relation is nowhere to be found. On the contrary, what rules there is the geometrical relation, the curved line, a discourse of opposites which results in harmony and beauty.

Now concerning the third position, on the content curriculum we have already referred to the world of work. Work and the world of work, in all the variety it has manifested itself to human beings either in the making of a stone tool or the use of a computer either as labor division or management, have constituted, at least up till now, the most vital and democratic means of life preservation in terms of human cooperation, quality of life, peaceful coexistence of peoples and cultures as well as in terms of the cultivation of duty among individuals and groups.

This co-existence or dialectical relationship between work, human interaction, and quality of life existed in ancient times, but it took its present shape after the 16th century. It constitutes, I believe, a particular European view of work as it combines individual initiative with social and cooperative endeavors. In Europe, for example, we cannot imagine the establishment of a factory without manpower (Computer Integrated Manufacturing) as it happened at Fanuc Industries at Mt. Fuji in Japan. On the contrary, forms of cooperative work are promoted involving groups of people (CEDEFOP, 1, 1987).

Especially I now that borders between nations, peoples and cultures are collapsing, the world is uniting socially and economically. At the same time, however, the world is being grouped into smaller nationalities and cultural entities. Thus it follows that the patterns for the coexistence of all people will be sought in the most familiar dual human relation existing in the interaction between education and productive work. That was the theme of the International Conference of Geneva, November 19th 1981, as well as a lot of other international conferences of UNESCO.

Paraphrasing Dewey's famous saying "learning by doing" I would say "learning by working". What I wish to communicate with this epigrammatic phrase is that what we call in education content curriculum and cognitive or meta-cognitive, holistic approach, may compose a general and special framework of application with the incorporation of work in school and the access of the educational community (students and teachers) to the places of work (Lundgren 1980, 1981, Unesco 1979, 1987). I would also like to add here that unless borders between school and work subside and peoples unite through work and the sense of duty, it is possible that new, terrible forms of despotism and brutality will emerge. Barbarity is not only a past phenomenon, it can easily become an immediate future one, given the peculiar conditions people experience today.

The most important element in the process of relating work to school is that today we are beginning to understand that the problem in this relation, between school and work has always constituted an essential criterion for the social directives set by each educator. Witnessing the dramatic events that take place today mainly in the East, we are given the chance to conceive new, significant prospects for humanity. The experiences of the past shed light and allow us to visualize life in the present and future. Today we are able to appreciate more why, according to Socrates, work as the basis of every activity has generated much wisdom and beauty in life. The triptych of work, wisdom and beauty has constituted a complete system for the humanization of man and the surmounting of the social mechanisms of alienation. According to Socrates, man finds the beauty of humanity through work. Today I would add: without work and in particular work in education we cannot hope for democracy. Now we can better conceive why Hegel claimed that by "working man achieves satisfaction and that through work, man began to perceive the world as a world of independent objects and activity subjects."

The above speculations imply that contemporary societies, peoples and states are not led to a rejection of human and democratic institutions neither do they subscribe to the chaos of allegedly new, hermaphroditical views; they proceed towards a concise new composition of democratic positions through a procedure from the past to the future and not through an unfamiliar future to an obsolete human past. It so happens that in our days a new Copernican revolution is taking place in our schools placing work at its very centre: around work evolve all the educational procedures of the new democratic structures created by people all over the world.

The research several parts of which I chose to present today indicated that the impact of Socrates' Dialectics in combination with work, and also the democratic conflict of ideas, knowledge and ideologies as well as the world of beauty could be included in a curriculum which would contribute to the elimination of contradictions and deadlocks of our turbulent times by formulating a multifold and multicultural education in a procedure from the past to the future of Europe and also from the West to the East and from the North to the South.

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